

Claims for the patent:

1. A tri-leaflet heart valve comprising:
an annular valve base with an inner surface defining a central orifice through which a blood flow moves from an upstream side to a downstream side;

three protruding hinges formed on the inner surface of the annular valve base and equally spaced along the inner surface of the annular valve base, each hinge comprising a convex downstream face connected to a convex upstream face by a curved ridge and a pair of concave sockets on opposite sides of the hinge; and

three leaflets arranged between adjacent hinges, each leaflet being provided with a pair of round pivots respectively mounted inside the concave sockets of the hinges and thus allowing the leaflets to rotate freely within the annular valve base;

when the leaflets are subject to a positive pressure from the blood flow, the leaflets are fully opened to allow the blood to flow through the central orifice, and when the leaflets are subject to a negative pressure, the leaflets are closed to occlude the blood flow.
2. The tri-leaflet heart valve as claimed in Claim 1, wherein each leaflet is a fan-shaped plate with a curved configuration forming a continuous and smooth solid surface with no sharp projections and side edges where the notches and round pivots are formed.
3. The tri-leaflet heart valve as claimed in Claim 2, wherein the fan-shaped leaflet has a downstream apex from which the two side edges extend, and where the side edges of adjacent leaflets tightly seal with each other when the leaflets close.
4. The tri-leaflet heart valve as claimed in Claim 2, wherein the fan-shaped

leaflet has a bottom edge forming a tight seal with the corresponding upstream recess on the inner surface of the annular valve when the leaflets are closed.

5. The tri-leaflet heart valve as claimed in Claim 2, wherein the downstream surface of the protruding hinge is configured to stop the rotation of the leaflet when the leaflet is opened and maintain it at a predetermined angle.
6. The tri-leaflet heart valve as claimed in Claim 2, wherein the ridge of the protruding hinge is configured so that, when the leaflet is closed, the ridge forms a tight seal with the notches of the leaflet.